

# The Operator Information and Bug-Tracking System at FLASH.



C. Gruen\*, A. Brinkmann  
DESY, Notkestraße 85, 22603 Hamburg, Germany

### Abstract

The free-electron laser FLASH at DESY in Hamburg provides high brilliance FEL radiation in the XUV and soft X-ray wavelength regime for user experiments. Starting in 2016 two separate undulator beamlines (FLASH1 and FLASH2) are being operated simultaneously, driven by a common superconducting LINAC. A third beamline is in use as alternative to FLASH2 to provide high current-density electron beams for the plasma-wakefield acceleration experiment FLASHForward. The accelerator is operated 24 hours a day, 7 days a week by a shift crew working in a three-shift system. In addition a machine coordination team decides on the schedule, machine upgrades, maintenance tasks, etc. The coordination team also handles the follow-up of technical issues which appear during operation. It is mandatory to have a steady exchange of information between the operating crew and the coordination team to achieve the most efficient and stable machine operation. On behalf of the FLASH coordination team we will describe the work flow and the tools we use to keep the machine operators informed about technical and operating issues and how the FLASH documentation and bug tracking system works. We will present the advantages and disadvantages of those tools and work flows and we will explain our ideas about future upgrades to combine different tasks in one common tool.

### Free-electron Laser FLASH its Coordination Team

#### FLASH Operating Concepts

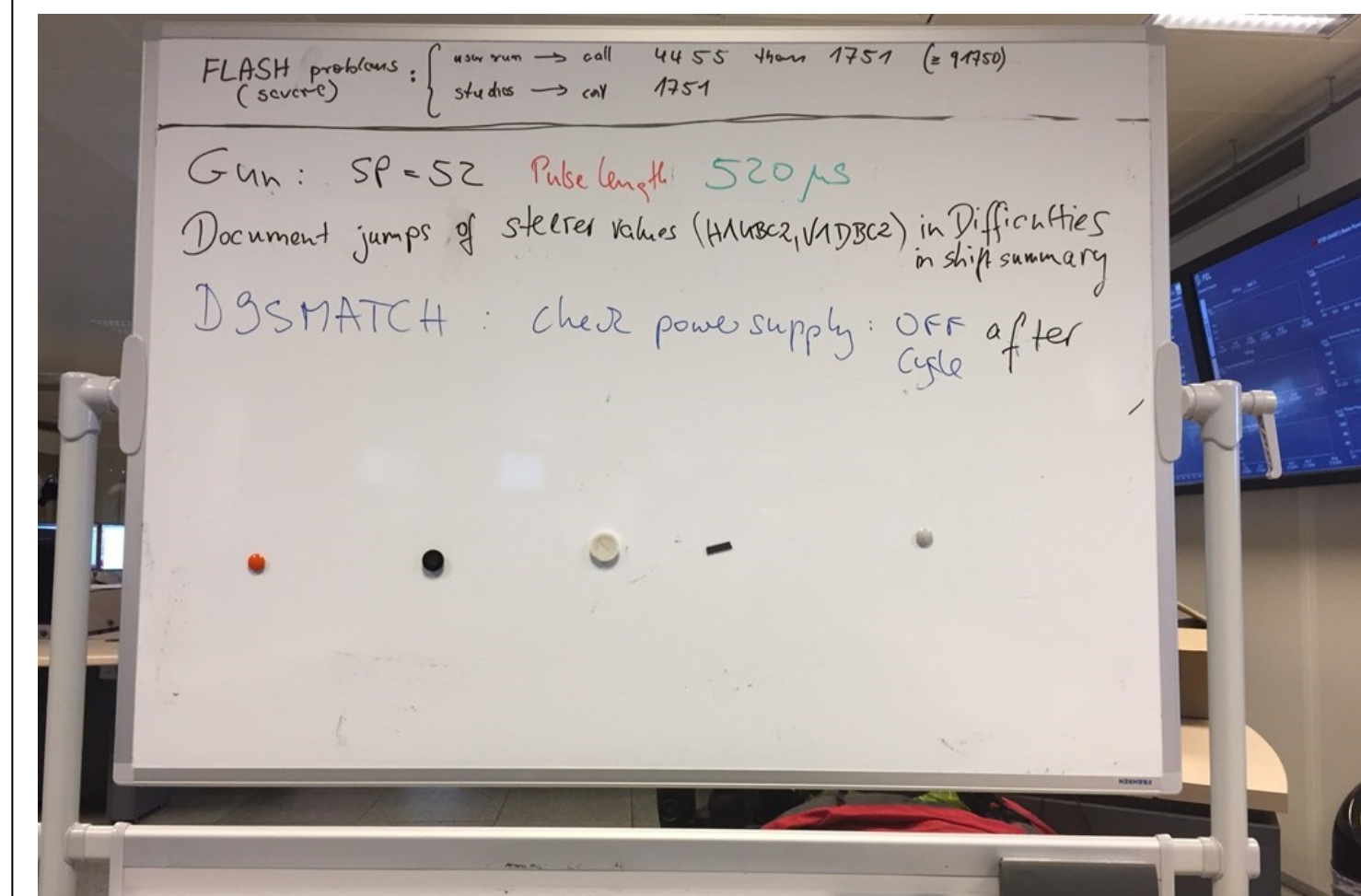
- 24/7 operation (three-shift system)
- Two operators per shift are responsible only for FLASH
- One machine coordinator and many on-call experts for special machine subsystems are available 24/7
- One technical coordinator is available during regular working time
- One SASE expert and one photon coordinator are on duty to support the machine setup and the photon users
- Operators only work 77 days per year in the DESY control room – the rest of the time they work in other technical groups

#### User Facility FLASH

- multi-user FEL operation
- 800  $\mu$ s bursts of electron bunches
- Repetition rate: 10Hz
- Simultaneous operation of two separated undulator beamlines driven by one common superconducting LINAC
- Beam parameters can be tuned individually for each beamline
- A third beamline is in use to provide high current-density beams for a plasma-wakefield experiment

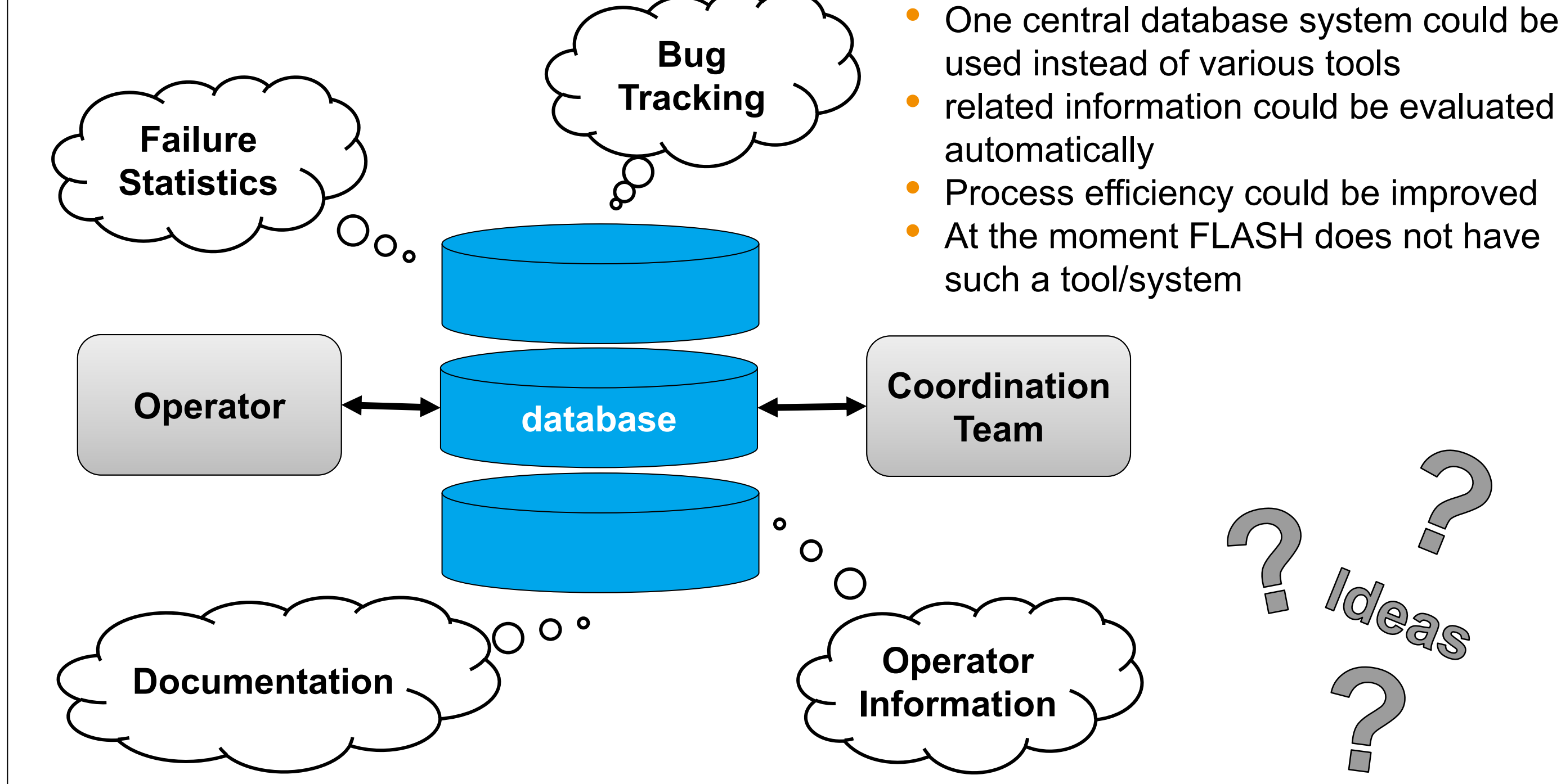
### The Information and Bug-Tracking Tools Currently in use at FLASH

- ### Atlassian Confluence Tool
- Built to be a knowledge management system
  - Used to distribute information about the current machine status (pending issues) and to store technical documentation files/meeting minutes
  - Website is running on a special overview display in the DESY control room
  - Accessible for everyone by simply using a web-browser



- ### Whiteboard in the FLASH Control Room
- Easiest way to provide information for the shift crew
  - Also the operators can easily use the whiteboard to save information for another shift crew
  - Information has to be copied into the other tools by hand

## Future Perspectives



## Conclusion

For large scale facilities like particle accelerators an efficient operator information and bug-tracking system is crucial. The machine operators have to be informed about pending machine issues and upgrades. Basic machine parameters can change from day to day. It is essential that this is being documented in a proper way and the same information is provided to all involved operators. Currently at FLASH various tools are used to fulfil these tasks. We provide an electronic logbook for documentation and information tasks, a request tracker which is used to do bug tracking and to keep the machine coordination team informed about actual issues. The confluence tool is used to inform the operators about pending issues and actual machine parameters. In addition a classical whiteboard is used to have an easy way to document settings quickly. All these tools fulfil their tasks but none of these tools is able to exchange data with one of the other tools. All interactions have to be done by hand. It turned out that the operator information and bug tracking process could be improved by using more efficient tools which are sharing the same data. We plan to upgrade our workflow process with a database tool in order to stay competitive in the future and to ensure a high FEL machine performance.